Artificial Intelligence–Based Chatbots for Promoting Health Behavioral Changes: Systematic Review

Year: 2023 | Citations: 348 | Authors: A. Aggarwal, C. Tam, Dezhi Wu, Xiaoming Li, S. Qiao

Abstract

Background Artificial intelligence (AI)–based chatbots can offer personalized, engaging, and on-demand health promotion interventions. Objective The aim of this systematic review was to evaluate the feasibility, efficacy, and intervention characteristics of AI chatbots for promoting health behavior change. Methods A comprehensive search was conducted in 7 bibliographic databases (PubMed, IEEE Xplore, ACM Digital Library, PsycINFO, Web of Science, Embase, and JMIR publications) for empirical articles published from 1980 to 2022 that evaluated the feasibility or efficacy of AI chatbots for behavior change. The screening, extraction, and analysis of the identified articles were performed by following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. Results Of the 15 included studies, several demonstrated the high efficacy of AI chatbots in promoting healthy lifestyles (n=6, 40%), smoking cessation (n=4, 27%), treatment or medication adherence (n=2, 13%), and reduction in substance misuse (n=1, 7%). However, there were mixed results regarding feasibility, acceptability, and usability. Selected behavior change theories and expert consultation were used to develop the behavior change strategies of AI chatbots, including goal setting, monitoring, real-time reinforcement or feedback, and on-demand support. Real-time user-chatbot interaction data, such as user preferences and behavioral performance, were collected on the chatbot platform to identify ways of providing personalized services. The AI chatbots demonstrated potential for scalability by deployment through accessible devices and platforms (eg, smartphones and Facebook Messenger). The participants also reported that AI chatbots offered a nonjudgmental space for communicating sensitive information. However, the reported results need to be interpreted with caution because of the moderate to high risk of internal validity, insufficient description of AI techniques, and limitation for generalizability. Conclusions AI chatbots have demonstrated the efficacy of health behavior change interventions among large and diverse populations; however, future studies need to adopt robust randomized control trials to establish definitive conclusions.